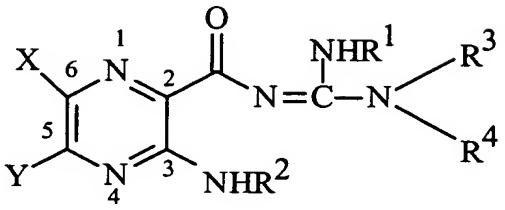
CLAIMS:

1. A compound represented by formula (I):



(I)

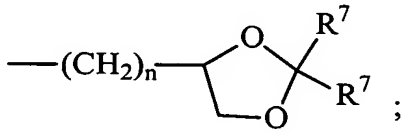
wherein

X is hydrogen, halogen, trifluoromethyl, lower alkyl, unsubstituted or substituted phenyl, lower alkyl-thio, phenyl-lower alkyl-thio, lower alkyl-sulfonyl, or phenyl-lower alkyl-sulfonyl;

Y is hydrogen, hydroxyl, mercapto, lower alkoxy, lower alkyl-thio, halogen, lower alkyl, unsubstituted or substituted mononuclear aryl, or $-N(R^2)_2$;

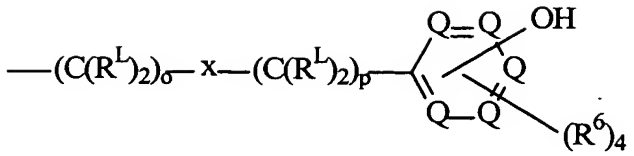
R^1 is hydrogen or lower alkyl;

each R^2 is, independently, $-R^7$, $-(CH_2)_m-OR^8$, $-(CH_2)_m-NR^7R^{10}$, $-(CH_2)_n(CHOR^8)(CHOR^8)_n-CH_2OR^8$, $-(CH_2CH_2O)_m-R^8$, $-(CH_2CH_2O)_m-CH_2CH_2NR^7R^{10}$, $-(CH_2)_n-C(=O)NR^7R^{10}$, $-(CH_2)_n-Z_g-R^7$,$-(CH_2)_m-NR^{10}-CH_2(CHOR^8)(CHOR^8)_n-CH_2OR^8$, $-(CH_2)_n-CO_2R^7$, or



;

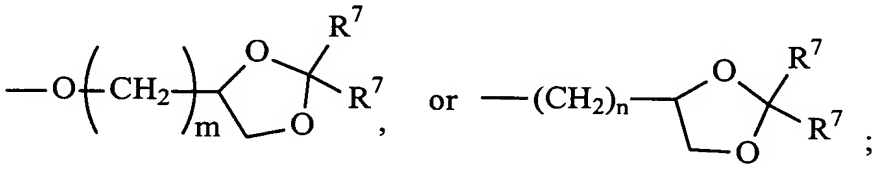
R^3 and R^4 are each, independently, hydrogen, a group represented by formula (A), lower alkyl, hydroxy lower alkyl, phenyl, phenyl-lower alkyl, (halophenyl)-lower alkyl, lower-(alkylphenylalkyl), lower alkoxyphenyl)-lower alkyl, naphthyl-lower alkyl, or pyridyl-lower alkyl, with the proviso that at least one of R^3 and R^4 is a group represented by formula (A):



(A)

wherein

each R^L is, independently, $-R^7$, $-(CH_2)_n-OR^8$, $-O-(CH_2)_m-OR^8$, $-(CH_2)_n-NR^7R^{10}$, $-O-(CH_2)_m-NR^7R^{10}$, $-(CH_2)_n(CHOR^8)(CHOR^8)_n-CH_2OR^8$, $-O-(CH_2)_m(CHOR^8)(CHOR^8)_n-CH_2OR^8$, $-(CH_2CH_2O)_m-R^8$, $-O-(CH_2CH_2O)_m-R^8$, $-(CH_2CH_2O)_m-CH_2CH_2NR^7R^{10}$, $-O-(CH_2CH_2O)_m-CH_2CH_2NR^7R^{10}$, $-(CH_2)_n-C(=O)NR^7R^{10}$, $-O-(CH_2)_m-C(=O)NR^7R^{10}$,$-(CH_2)_n-(Z)_g-R^7$,$-O-(CH_2)_m-(Z)_g-R^7$, $-(CH_2)_n-NR^{10}-CH_2(CHOR^8)(CHOR^8)_n-CH_2OR^8$, $-O-(CH_2)_m-NR^{10}-CH_2(CHOR^8)(CHOR^8)_n-CH_2OR^8$, $-(CH_2)_n-CO_2R^7$, $-O-(CH_2)_m-CO_2R^7$, $-OSO_3H$, -O-glucuronide, -O-glucose, or



each x is, independently, O, NR^7, C=O, CHOH, $C=N-R^6$, or represents a single bond;

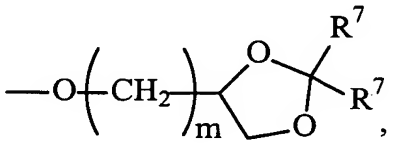
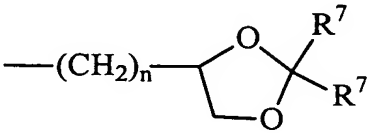
each o is, independently, an integer from 0 to 10;

each p is, independently, an integer from 0 to 10;

with the proviso that (a) the sum of o and p in each contiguous chain is from 1 to 10 when x is O, NR^7, C=O, or $C=N-R^6$ or (b) that the sum of o and p in each contiguous chain is from 4 to 10 when x represents a single bond;

each R^6 is, independently, $-R^7$, -OH, $-OR^{11}$, $-N(R^7)_2$, $-(CH_2)_m-OR^8$, $-O-(CH_2)_m-OR^8$, $-(CH_2)_n-NR^7R^{10}$, $-O-(CH_2)_m-NR^7R^{10}$, $-(CH_2)_n(CHOR^8)(CHOR^8)_n-CH_2OR^8$, $-O-(CH_2)_m(CHOR^8)(CHOR^8)_n-CH_2OR^8$, $-(CH_2CH_2O)_m-R^8$, $-O-(CH_2CH_2O)_m-R^8$, $-(CH_2CH_2O)_m-CH_2CH_2NR^7R^{10}$, $-O-(CH_2CH_2O)_m-CH_2CH_2NR^7R^{10}$, $-(CH_2)_n-C(=O)NR^7R^{10}$,

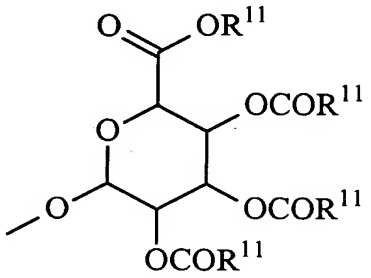
$-O-(CH_2)_m-C(=O)NR^7R^{10}$, $-(CH_2)_n-(Z)_g-R^7$, $-O-(CH_2)_m-(Z)_g-R^7$,
$-(CH_2)_n-NR^{10}-CH_2(CHOR^8)(CHOR^8)_n-CH_2OR^8$,
$-O-(CH_2)_m-NR^{10}-CH_2(CHOR^8)(CHOR^8)_n-CH_2OR^8$,
$-(CH_2)_n-CO_2R^7$, $-O-(CH_2)_m-CO_2R^7$, $-OSO_3H$, -O-glucuronide, -O-glucose,


, or

;

wherein when two R^6 are $-OR^{11}$ and are located adjacent to each other on a phenyl ring, the alkyl moieties of the two R^6 may be bonded together to form a methylenedioxy group;

each R^7 is, independently, hydrogen or lower alkyl;

each R^8 is, independently, hydrogen, lower alkyl, $-C(=O)-R^{11}$, glucuronide, 2-tetrahydropyranyl, or


;

each R^9 is, independently, $-CO_2R^7$, $-CON(R^7)_2$, $-SO_2CH_3$, or $-C(=O)R^7$;

each R^{10} is, independently, -H, $-SO_2CH_3$, $-CO_2R^7$, $-C(=O)NR^7R^9$, $-C(=O)R^7$, or $-CH_2-(CHOH)_n-CH_2OH$;

each Z is, independently, CHOH, C(=O), $CHNR^7R^{10}$, $C=NR^{10}$, or NR^{10};

each R^{11} is, independently, lower alkyl;

each g is, independently, an integer from 1 to 6;

each m is, independently, an integer from 1 to 7;

each n is, independently, an integer from 0 to 7;

each Q is, independently, C-R^5, C-R^6, or a nitrogen atom, wherein at most three Q in a ring are nitrogen atoms;

or a pharmaceutically acceptable salt thereof, and
inclusive of all enantiomers, diastereomers, and racemic mixtures thereof.

2. The compound of Claim 1, wherein Y is $-NH_2$.

3. The compound of Claim 2, wherein R^2 is hydrogen.

4. The compound of Claim 3, wherein R^1 is hydrogen.

5. The compound of Claim 4, wherein X is chlorine.

6. The compound of Claim 5, wherein R^3 is hydrogen.

7. The compound of Claim 6, wherein each R^L is hydrogen.

8. The compound of Claim 7, wherein o is 4.

9. The compound of Claim 8, wherein p is 0.

10. The compound of Claim 9, wherein x represents a single bond.

11. The compound of Claim 10, wherein each R^6 is hydrogen.

12. The compound of Claim 11, wherein at most one Q is a nitrogen atom.

13. The compound of Claim 12, wherein no Q is a nitrogen atom.

14. The compound of Claim 1, wherein
X is halogen;
Y is $-N(R^7)_2$;
R^1 is hydrogen or C_1-C_3 alkyl; and
R^2 is $-R^7$, $-(CH_2)_m-OR^7$, or $-(CH_2)_n-CO_2R^7$;

R^3 is a group represented by formula (A); and

R^4 is hydrogen, a group represented by formula (A), or lower alkyl;

15. The compound of Claim 14, wherein

X is chloro or bromo;

Y is $-N(R^7)_2$;

R^2 is hydrogen or C_1-C_3 alkyl;

at most three R^6 are other than hydrogen as defined above;

at most three R^L are other than hydrogen as defined above; and

at most 2 Q are nitrogen atoms.

16. The compound of Claim 15, wherein Y is $-NH_2$.

17. The compound of Claim 16, wherein

R^4 is hydrogen;

at most one R^L is other than hydrogen as defined above;

at most two R^6 are other than hydrogen as defined above; and

at most 1 Q is a nitrogen atom.

18. The compound of Claim 17, wherein x is O, NR^7, C=O, CHOH, or C=N-R^6.

19. The compound of Claim 17, wherein x represents a single bond.

20. The compound of Claim 1, wherein x is O, NR^7, C=O, CHOH, or C=N-R^6.

21. The compound of Claim 1, wherein x represents a single bond.

22. The compound of Claim 1, wherein each R^6 is hydrogen.

23. The compound of Claim 1, wherein at most two R^6 are other than hydrogen as defined in Claim 1.

24. The compound of Claim 1, wherein one R^6 is other than hydrogen as defined in Claim 1.

25. The compound of Claim 1, wherein one R^6 is -OH.

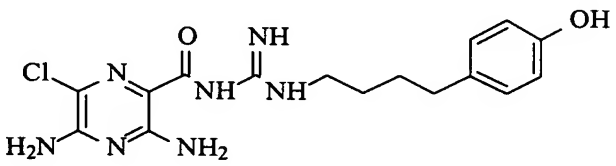
26. The compound of Claim 1, wherein each R^L is hydrogen.

27. The compound of Claim 1, wherein at most two R^L are other than hydrogen as defined in Claim 1.

28. The compound of Claim 1, wherein one R^L is other than hydrogen as defined in Claim 1.

29. The compound of Claim 1, wherein x represents a single bond and the sum of o and p is 4 to 6.

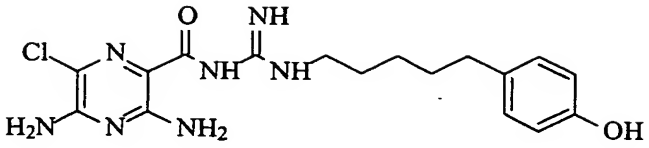
30. The compound of Claim 1, which is represented by the formula



31. The compound of Claim 30, which is in the form of a pharmaceutically acceptable salt.

32. The compound of Claim 31, which is in the form of a hydrochloride salt.

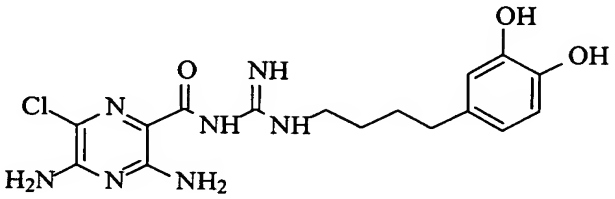
33. The compound of Claim 1, which is represented by the formula



34. The compound of Claim 33, which is in the form of a pharmaceutically acceptable salt.

35. The compound of Claim 34, which is in the form of a hydrochloride salt.

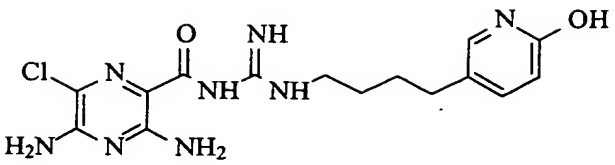
36. The compound of Claim 1, which is represented by the formula



37. The compound of Claim 36, which is in the form of a pharmaceutically acceptable salt.

38. The compound of Claim 37, which is in the form of a hydrochloride salt.

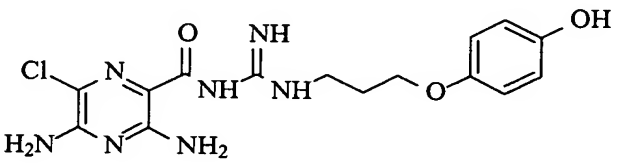
39. The compound of Claim 1, which is represented by the formula



40. The compound of Claim 39, which is in the form of a pharmaceutically acceptable salt.

41. The compound of Claim 40, which is in the form of a hydrochloride salt.

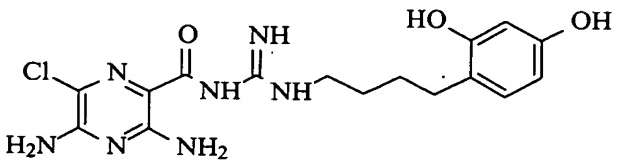
42. The compound of Claim 1, which is represented by the formula



43. The compound of Claim 42, which is in the form of a pharmaceutically acceptable salt.

44. The compound of Claim 43, which is in the form of a hydrochloride salt.

45. The compound of Claim 1, which is represented by the formula



46. The compound of Claim 45, which is in the form of a pharmaceutically acceptable salt.

47. The compound of Claim 46, which is in the form of a hydrochloride salt.

48. The compound of Claim 1, which is in the form of a pharmaceutically acceptable salt.

49. A pharmaceutical composition, comprising the compound of Claim 1 and a pharmaceutically acceptable carrier.

50. A method of promoting hydration of mucosal surfaces, comprising:

administering an effective amount of the compound of Claim 1 to a mucosal surface of a subject.

51. A method of restoring mucosal defense, comprising:

topically administering an effective amount of the compound of Claim 1 to a mucosal surface of a subject in need thereof.

52. A method of blocking sodium channels, comprising:

contacting sodium channels with an effective amount of the compound of Claim 1.

53. A method of treating chronic bronchitis, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

54. A method of treating cystic fibrosis, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

55. A method of treating sinusitis, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

56. A method of treating vaginal dryness, comprising:

administering an effective amount of the compound of Claim 1 to the vaginal tract of a subject in need thereof.

57. A method of treating dry eye, comprising:

administering an effective amount of the compound of Claim 1 to the eye of a subject in need thereof.

58. A method of promoting ocular hydration, comprising:

administering an effective amount of the compound of Claim 1 to the eye of a subject.

59. A method of promoting corneal hydration, comprising:

administering an effective amount of the compound of Claim 1 to the eye of a subject.

60. A method of promoting mucus clearance in mucosal surfaces, comprising:

administering an effective amount of the compound of Claim 1 to a mucosal surface of a subject.

61. A method of treating Sjogren's disease, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

62. A method of treating distal intestinal obstruction syndrome, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

63. A method of treating dry skin, comprising:

administering an effective amount of the compound of Claim 1 to the skin of a subject in need thereof.

64. A method of treating esophagitis, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

65. A method of treating dry mouth (xerostomia), comprising:

administering an effective amount of the compound of Claim 1 to the mouth of a subject in need thereof.

66. A method of treating nasal dehydration, comprising:

administering an effective amount of the compound of Claim 1 to the nasal passages of a subject in need thereof.

67. The method of Claim 66, wherein the nasal dehydration is brought on by administering dry oxygen to the subject.

68. A method of preventing ventilator-induced pneumonia , comprising:

administering an effective amount of the compound of Claim 1 to a subject on a ventilator.

69. A method of treating asthma, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

70. A method of treating primary ciliary dyskinesia, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

71. A method of treating otitis media, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

72. A method of inducing sputum for diagnostic purposes, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

73. A method of treating chronic obstructive pulmonary disease, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

74. A method of treating emphysema, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

75. A method of treating pneumonia, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

76. A method of treating constipation, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

77. The method of Claim 76, wherein the compound is administered orally or via a suppository or enema.

78. A method of treating chronic diverticulitis, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

79. The present invention also provides a method of treating rhinosinusitis, comprising:

administering an effective amount of the compound of Claim 1 to a subject in need thereof.

80. A composition, comprising:

the compound of Claim 1; and

a P2Y2 inhibitor.

81. A composition, comprising:

the compound of Claim 1; and

a bronchodilator.